DOCUMENT RESUME

ED 300 279 SE 050 138

AUTHOR Wynn, Denise E.; Fletcher, Richard K., Jr.
TITLE A Comparison of the Performance of RDS and Non-RDS Students in College Mathematics.
PUB DATE 87
NOTE 21p.; Paper presented at the Annual Meeting of the Tennessee Academy of Science (Jackson, TN, November 20, 1987). Based on Master's Thesis completed at Tennessee Technological University.
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *College Mathematics; College Students; Higher Education; *Mathematics Instruction; *Prediction; *Remedial Instruction; Remedial Mathematics

ABSTRACT

This study compared former remedial students with non-remedial students in regular college mathematics courses. The two groups were compared on regular college mathematics grades, ACT composite scores, ACT mathematics scores, and high school grade point average. Results from the analysis of variance indicated no statistically significant difference on regular college mathematics grades but highly significant differences on the other three predictor variables. Results from stepwise linear regression indicated that performance on RDS courses and tests were better predictors for RDS students while the ACT mathematics scores and high school grades were better for regular college students. (Author)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED300279

A COMPARISON OF THE PERFORMANCE OF RDS AND NON-RDS STUDENTS IN COLLEGE MATHEMATICS

a paper
presented at

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
X This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

The Annual Meeting of the
Tennessee Academy of Science
Jackson State Community College
November 20, 1987

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
Richard K. Fletcher, Jr.
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

by

Denise E. Wynn
Richard K. Fletcher, Jr.
Tennessee Technological University

This paper was based upon the Masters Thesis completed by Ms. Wynn in August, 1987 at Tennessee Technological University.

SE050138

BEST COPY AVAILABLE

Abstract

A COMPARISON OF THE PERFORMANCE OF RDS
AND NON-RDS STUDENTS IN COLLEGE MATHEMATICS

Denise E. Wynn
Richard K. Fletcher,Jr.

This study compared former remedial students with non-remedial students in regular college mathematics courses. The two groups were compared on regular college mathematics grades, ACT composite scores, ACT mathematics scores, and high school grade point averages. Results from the analysis of variance indicated no statistically significant difference on regular college mathematics grades but highly significant differences on the other three predictor variables. Results from stepwise linear regression indicated that performance on RDS courses and tests were better predictors for RDS students while the ACT mathematics scores and high school grades were better for regular college students.

TABLE OF CONTENTS

Page No.

INTRODUCTION 1

REVIEW OF RELATED LITERATURE 2

METHODOLOGY 6

ANALYSIS OF DATA 8

TABLE I 10
TABLE II 12
TABLE III 13
TABLE IV 13
TABLE V 14

SUMMARY AND CONCLUSIONS 14
REFERENCES 16

INTRODUCTION

Remedial enrollment at four year institutions of higher education increased seventy-two percent between 1975 and 1980; while total student population increased by only seven percent (Chang, 1983). This jump in remedial enrollment indicates that many unprepared, non-traditional students are entering college. If these students are to survive as college students, prosper, and meet the demands of our society, they are going to need quality remediation. This means that the remedial programs must be able to rectify the deficient backgrounds the high-risk students possess. Hence, any remedial/developmental program's merit can be judged only by the degree of success of its students.

The remedial/developmental program (RDS) as mandated by the State of Tennessee is relatively new at Tennessee Technological University. Important questions regarding the worth of the program which this investigation attempted to answer were:

1. Are the remedial students successful upon completion of this program? What grade distribution did they make?

2. Are the remedial students able to perform as effectively as non-remedial students in the regular college mathematics courses?

3. Does the performance of remedial students in the RDS program predict how well they will perform in a regular course in college mathematics?

Students at Tennessee Technological University who completed the remedial mathematics course through winter quarter 1987 were tracked for completion of a regular college mathematics course. They were compared with non-remedial mathematics students in the same course in college mathematics. An analysis of variance was computed to determine if the former remedial-developmental students performed as well as the non-remedial students based on the scores earned by each student in their regular college mathematics class. Pearson correlation coefficients were calculated to determine which predictors of success in college mathematics were most accurate for remedial developmental students.

REVIEW OF RELATED LITERATURE

A number of studies relating to this investigation are reported in the literature. One investigation revealed from the analysis of the final grades achieved in a college algebra course that eighty-one percent of the former remedial-developmental students successfully completed college level mathematics as compared to only eighty percent of the non-remedial students (Wepner 1985).

According to Lee C. Kolzow (1986), in a study done at Harper College, it was revealed that students who did well in remedial courses were much more likely to earn a higher overall grade point average and to persist longer at the college than those students who did not participate in remedial courses. Moreover, those students were much more likely to take and do well in the specific college level courses for which they were prepared by the remedial course for which they were enrolled. This indicated that the remedial courses taken by the students may have had a positive effect on their learning.

June R. Sparks and Cynthia L. Davis (1977) evaluated the special studies department at Dalton Junior College. They accomplished this by evaluating the performance of former special studies students and regular college students with respect to their grades. A comparison was made of students enrolled in credit English, mathematics, and social science courses who had been assigned to the special studies English, mathematics, and reading courses, respectively. A summary of the study indicated that when special studies students moved into credit courses they performed as well as the regular or other students in their classes.

The authors of another study, this one conducted at the University of Montana, sought to appraise the effectiveness of remedial mathematics on Native American students attending the University. The goal of the study was to find if the remediation prepared them for entry into regular college mathematics. The findings revealed that the remedial students, both Native Americans--about sixty percent and non-Native Americans--about sixty-seven percent taking the regular mathematics sequence did about as well or better than regular students attending those same sequence courses (i.e. about sixty-one percent of the students without prior remedial instruction were able to pass the initial math sequence course). Additionally in the next subsequent regular mathematics sequence course (Math 105 and 108), remedial students by as much as ninety-two percent were much more likely to pass than their counterparts

(non-remedial students) who had a percentage rate of only seventy-eight (Brod and Brod 1982).

However, not all studies conducted on remedial students and their counterparts have brought about the before mentioned conclusions. A case in point would be the study conducted at two large urban state universities - California State University at Northridge and San Diego State University. The study in part examined the impact of the remedial mathematics program on freshmen persistence and grade performance. Since the two groups (remedial and regular students) were not comparable in academic preparation, the comparisons were made between them within the same level on the Scholastic Aptitude Test. Their skills were measured by locally developed competency tests. Thus, they were pared accordingly. The persistence rates of the remedial and non-remedial students were very similar. Though while they persisted, the underprepared students did not earn passing grades as often as other students. This was found to be true at each university. (McCornak & others 1985)

Ping-Tang Chang (1983), at Augusta College in Georgia, conducted a national survey to determine and understand practically every aspect of the remedial programs across the country. Two hundred questionnaires were sent to college mathematics instructors. There were 146 or seventy-three percent of questionnaires received by the deadline date. The data collected from the survey showed forty-two percent of the schools reported that fifty-one to seventy-five percent of the remedial students successfully completed at least one college level math course. It also revealed that colleges which carried out intensive studies on the performance of the remedial students reported that the ones who had completed the remedial training were better than the other students in terms of retention rate or success rate.

Once these previously unprepared college students have attained the same comparable rate of success as their regular college peers, another aspect must be considered. Do they maintain their success rate? Here is one study that asserts that remedial students do. When an investigation was done on freshmen who had completed a basic skills course, whether or not these students demonstrated a higher level of academic performance when matched against regular students, the researchers found that basic skills intervention (remedial programs) did have a positive short- and long-term effect on academic performance (Behrman, Dark, and Paul 1984). A different technique was employed to discover the effects of remedial mathematics on the final grade in algebra. This ameliorated approach provided

students the opportunity to take a course that allowed them to progress through fourteen units of remedial algebra at their own pace. The Kruskel-Wallis One-Way Analysis of Variance and Mann-Whitney U Test procedures were used to correlate the data and make group comparisons. The analysis of variance revealed that a significant difference did occur in the treatment groups' final college algebra grade. Mann-Whitney results indicated that students who passed remedial algebra and then took college algebra had significantly higher final algebra grades than did undergraduates: (1) who failed remedial mathematics then took college algebra, or (2) who passed or failed college algebra (Head and Lindsey 1984).

A meta analysis conducted by Kulik, Kulik, and Shwalb (1983) was undertaken to synthesize evaluation findings on colleges' remedial programs for underprepared or high-risk students. In essence, they simply collected a number of studies that measured the remedial students' performance and the remedial program itself. Their aim was to answer several major questions about these types of programs. Overall, the effects reported in these studies were basically positive. In forty-four of the fifty-seven studies, grade point averages were higher for students from the special programs while thirteen studies reported higher grade point averages for the control students. Seventeen of the fifty-seven studies reported a statistically significant difference in grade point averages for students in special and control groups. Results from sixteen of these seventeen studies favored special programs, the other study favored the students in the control group. According to the researchers, if the special programs for high-risk students had no systematic effect on students' grade point averages, about half the results would have favored the special programs and about half would have favored the control programs. Instead, a clear majority of the studies favored the special programs.

An investigation was conducted at the University Community and Technical College of the University of Toledo (Morgan, 1970) to report on a method of predicting success in a first-year junior mathematics course. A discriminant analysis was used to produce a discriminate equation. This equation employed the following factors: (1) score on a cooperative math test; (2) years of high school math; (3) mean grade in high school math; and (4) age-in months beyond the seventeenth birthday. The discriminant equation which resulted from this analysis was concluded to be accurate in ninety percent of its predictions.

Other research has shown that the predictability of grades is also affected by the heterogeneity of the academic programs of colleges. That is, the more diverse the curricula in terms of major fields, divisions, colleges, etc., the less predictable the grades (Baird, 1984). Therefore, the less homogeneous the college makeup, the less predictable are the grades. Furthermore, studies have shown that grades of four-year college students are more predictable than those of community college students, the grades of students in private colleges are more predictable than those in public colleges, and the grades of students in high cost institutions are more predictable than those in low cost institutions.

Ervin and Hogrebe (1984) conducted a study to compare the relationship of certain predictor variables to college academic performance for regularly admitted students and those students in developmental (remedial) studies. Since the remedial students generally scored lower on the university requirements of high school grade point average and Scholastic Aptitude Test, it was very important to determine the predictive validity of these variables for the two groups of students in reference to academic performance. The important finding of this study was that the predictor variables for regular students accounted for two and one-half times more unique variance in freshmen GPA (grade point average) than the predictors for developmental students. This implies that the estimation of freshmen grade point averages based on the prediction variables of high school grade point averages and Scholastic Aptitude Test scores were more accurate for regular students.

At the junior college level, it has been shown that prediction of academic success in remedial mathematics can be made. Edwards (1972) studied data on 181 remedial students enrolled in seven public community colleges. In using five selected predictors, he was able to report that prediction of success in remedial mathematics courses can be made correctly seventy-one percent of the time.

Another aspect in predicting the performance of remedial students is determining long-term academic performance after a student has completed a developmental course. The purpose of the Robyak and Downey (1979) investigation was to identify the factors associated with the outcome of remedial instruction on an extended time basis. Data on the students used in this study were compared. An attempt was made to find the extent to which their academic performance could be predicted by a combination of personality type, prior academic achievement level, and study skills knowledge. It was concluded from

the analysis that the best predictors of extented academic performance were past academic performance and the change in study habits made during the remedial course.

METHODOLOGY

The subjects for this study consisted of all former RDS students at Tennessee Technological University who had completed at least one course of regular college mathematics between the spring quarter 1986 and spring quarter 1987 (Summer 1986 was not included). There were 253 students. Also included among the total subjects were non-RDS students. These students were drawn from the same regular college mathematics classes and sections as those attended by the former RDS students. The students chosen for the comparison group were selected systematically with every fifth non-RDS student being chosen resulting in a total of 231 students. From the 253 RDS subjects gathered, 213 were used in the investigation. Forty were excluded due to the students either receiving a final college mathematics grade of W and/or their permanent record files lacked the necessary information to conduct the study. Of the 231 non-RDS students first chosen, 152 were used. Seventy-nine were dropped because they were transfer students, they received a grade of W for a final college mathematics grade, or their permanent records were incomplete.

The computer facilities at Tennessee Technological University, which contain the Statistical Analysis System (SAS) were employed to analyze these data. The one-way analysis of variance was used to determine if statistically significant differences existed between the RDS students and the non-RDS students on each of the different variables. These variables included: (1) regular college mathematics final grades, (2) ACT mathematics scores, (3) ACT composite scores, and (4) high school grade point averages. Correlational analysis and a stepwise linear regression test were used in discriminating which of the predictor variables were best in determining success in college mathematics course. Comparisons were also made between male and female students on each of these variables.

The F-ratio statistic, the Pearson correlation coefficient, or chi-squared statistical procedure, using the 0.05 level of significance, was used to establish whether to reject each of the following null hypotheses:

1. There is no statistically significant difference between the RDS students final grades in regular college mathematics and non-RDS students final grades in college mathematics.

2. There is no statistically significant difference between the RDS student's ACT composite scores and the non-RDS student's ACT composite scores.

3. There is no statistically significant difference between the RDS student's ACT mathematics scores and the non-RDS student's ACT mathematics scores.

4. There is no statistically significant difference between the RDS student's high school grade point averages and the non-RDS student's high school grade point averages.

5. There is no statistically significant difference between scores of males in the RDS group and scores of females in the RDS group on their college mathematics final grades.

6. There is no statistically significant difference between scores of males in the RDS group and scores of females in the RDS group on ACT composite scores.

7. There is no statistically significant difference between scores of males in the RDS group and scores of female in the RDS group on the ACT mathematics score.

8. There is no statistically significant difference between scores of males in the RDS group and females in the RDS group on high school grade point averages.

9. There is no statistically significant difference between scores of males in the non-RDS group and scores of females in the non-RDS group on their college mathematics final grades.

10. There is no statistically significant difference between scores of males in the non-RDS group and scores of females in the non-RDS group on the ACT composite scores.

11. There is no statistically significant difference between scores of males in the non-RDS group and scores of females in the non-RDS group on the ACT mathematics scores.

12. There is no statistically significant difference between scores of males in the non-RDS group and scores of females in the non-RDS group on high school grade point averages.

13. There is no statistically significant difference between the college mathematics final grades of males in RDS and males in the non-RDS group.

14. There is no statistically significant difference between ACT composite scores of males in RDS and the scores of males in the non-RDS group.

15. There is no statistically significant difference between ACT mathematics scores of males in RDS and males in the non-RDS group.

16. There is no statistically significant difference between high school grade point averages of males in RDS and males in the non-RDS group.

17. There is no statistically significant difference between the college mathematics final grade of females in RDS and females in the non-RDS group.

18. There is no statistically significant difference between ACT composite scores of females in RDS and females in the non-RDS group.

19. There is no statistically significant difference between ACT mathematics scores of females in RDS and female in the non-RDS group.

20. There is no statistically significant difference between high school grade point averages of females in RDS and females in the non-RDS group.

21. There is no statistically significant relationship between each pair of the following sets of predictor variables: ACT composite scores and college mathematics grades, ACT mathematics scores and college mathematics grades, high school grade point averages and college mathematics grades, and RDS post algebra test scores and college mathematics grades.

22. There is no statistically significant difference between the distribution of college mathematics grades between the RDS and non-RDS students.

ANALYSIS OF DATA

The following dependent and predictor variables were used in describing the results from the analysis of variance and correlational computations employed to test the aforementioned null hypotheses:

Y1 = Grades in College Mathematics
Y2 = Scores on the ACT Composite Test
Y3 = Scores on the ACT Mathematics Test
Y4 = High School Grade Point Averages

Y5 = Grades for the RDS084 Course
Y6 = Scores on the RDS Post-Test in Algebra

The following classification variables were used in describing the results from the statistical tests employed for each of the null hypotheses listed above:

X1 = RDS Students in College Mathematics
X2 = Non-RDS Students in College Mathematics
X3 = RDS Students on ACT Composite Test Score
X4 = Non-RDS Students on ACT Composite Test Score
X5 = RDS Students on ACT Mathematics Score
X6 = Non-RDS Students on ACT Mathematics Score
X7 = RDS Students High School Grade Point Averages
X8 = Non-RDS Students High School Grade Point Average
X9 = RDS Males in College Mathematics
X10 = RDS Females in College Mathematics
X11 = RDS Males on ACT Composite Score
X12 = RDS Females on ACT Composite Score
X13 = RDS Males on ACT Mathematics Score
X14 = RDS Females on ACT Mathematics Score
X15 = RDS Males High School Grade Point Average
X16 = RDS Females High School Grade Point Average
X17 = Non-RDS Males in College Mathematics
X18 = Non-RDS Females in College Mathematics
X19 = Non-RDS Males on ACT Composite Score
X20 = Non-RDS Females on ACT Composite Score
X21 = Non-RDS Males on ACT Mathematics Score
X22 = Non-RDS Females on ACT Mathematics Score
X23 = Non-RDS Males High School Grade Point Average
X24 = Non-RDS Females High School Grade Point Average
X25 = Only RDS Males in College Mathematics
X26 = Only Non-RDS Males in College Mathematics
X27 = Only RDS Males on ACT Composite Score
X28 = Only Non-RDS Males on ACT Composite Score
X29 = Only RDS Males on ACT Mathematics Score
X30 = Only Non-RDS Males on ACT Mathematics Score
X31 = Only RDS Males High School Grade Point Average
X32 = Only Non-RDS Males High Sch. Grade Point Average
X33 = Only RDS Females in College Mathematics
X34 = Only Non-RDS Females in College Mathematics
X35 = Only RDS Females on ACT Composite Score
X36 = Only Non-RDS Females on ACT Composite Score
X37 = Only RDS Females on ACT Mathematics Score
X38 = Only Non-RDS Females on ACT Mathematics Score
X39 = Only RDS Females High School Grade Average
X40 = Only Non-RDS Females High School Grade Average
X41 = Only RDS Males Grades for RDS084
X42 = Only RDS Females Grades for RDS084
X43 = Only RDS Males Grades for RDS Post-Test
X44 = Only RDS Females Grades for RDS Post-Test

The F-ratio statistic was calculated to determine if statistically significance differences existed between classification groups for each of the four dependent variables. The results are depicted in TABLE I which follows.

TABLE I

RESULTS FROM THE ONE-WAY ANALYSIS OF VARIANCE COMPARING RDS AND NON-RDS STUDENTS BY THE SEVERAL CLASSIFICATION GROUPS

Criterion	Hypotheses Tested	Mean 1 and N Of Cases	Mean 2 and N Of Cases	DF	F-Ratio	Significance
Y1	X1 = X2	1.94 213	2.01 152	1	0.44	n.s
Y2	X3 = X4	15.4 213	19.8 152	1	132.75	0.0001
Y3	X5 = X6	11.8 213	18.3 152	1	180.02	0.0001
Y4	X7 = X8	2.80 213	2.99 152	1	11.53	0.0008
Y1	X9 = X10	1.72 105	2.16 108	1	5.56	0.0193
Y2	X11 = X12	15.2 105	15.6 108	1	0.87	n.s
Y3	X13 = X14	11.9 105	11.8 108	1	0.07	n.s
Y4	X15 = X16	2.67 105	2.92 108	1	13.17	0.0004
Y1	X17 = X18	1.80 83	2.26 69	1	3.67	n.s
Y2	X19 = X20	19.5 83	20.2 69	1	1.08	n.s
Y3	X21 = X22	17.8 83	18.9 69	1	1.55	n.s
Y4	X23 = X24	2.82 83	3.20 69	1	17.81	0.0001
Y1	X25 = X26	1.72 105	1.80 83	1	0.16	n.s
Y2	X27 = X28	15.2 105	19.5 83	1	60.17	0.0001
Y3	X29 = X30	11.9 105	17.8 83	1	76.51	0.0001
Y4	X31 = X32	2.67 105	2.82 83	1	4.08	0.0449
Y1	X33 = X34	2.16 108	2.26 69	1	0.19	n.s

TABLE I (cont.)

RESULTS FROM THE ONE-WAY ANALYSIS OF VARIANCE COMPARING RDS AND NON-RDS STUDENTS BY THE SEVERAL CLASSIFICATION GROUPS

Criterion	Hypotheses Tested	Mean 1 and N Of Cases	Mean 2 and N Of Cases	DF	F-Ratio	Significance
Y2	X35 = X36	15.6 108	20.2 69	1	76.10	0.0001
Y3	X37 = X38	11.8 108	18.9 69	1	106.63	0.0001
Y4	X39 = X40	2.92 108	3.20 69	1	11.52	0.0009
Y5	X41 = X42	2.88 105	3.02 108	1	1.63	0.2027
Y6	X43 = X44	15.2 105	15.9 108	1	1.34	0.2489

These results indicated that there were no statistically significant differences on the comparisons relating to college mathematics final grades of: (1) RDS students and non-RDS students (X1 = X2), (2) non-RDS females and non-RDS males (X17 = X18), (3) only RDS males and only non-RDS males (X25 = X26), and (4) RDS females and non-RDS females (X33 = X34). Also ACT composite scores of RDS males and females (X11 = X12) and non-RDS males and non-RDS females (X19 = X20) showed no statistically significant differences. Furthermore, there were no statistically significant differences on ACT mathematics scores for RDS females and males (X13 = X14), non-RDS females and males (X21 = X22), only RDS males and only rds females grades in RDS084 (X41 = X42), and only RDS males and only RDS females scores on the RDS Post-Test(X43 = X44). As expected there were statistically significAnt differences on all comparisons between RDS and non-RDS students on the ACT measures and high school quality point averages.

The correlation matrices were computed by using the college mathematics final grades, the remedial/developmental 084 course final grades, the remedial/developmental post algebra scores, the ACT composite scores, the ACT mathematics scores, and the high school grade point averages. In each case only those variables that were significant to the group were used. For the total group,

only the college mathematics final grades, the ACT composite scores, the ACT mathematics scores, and the high school grade point averages were employed. The final results for the total group are presented in TABLE II.

TABLE II

PEARSON CORRELATIONS FOR COLLEGE MATHEMATICS FINAL GRADES, ACT COMPOSITE SCORES, ACT MATHEMATICS SCORES, AND HIGH SCHOOL GRADE POINT AVERAGES
TOTAL GROUP - N=356

	Y1	Y2	Y3	Y4
Y1	1.00	0.22	0.22	0.40
Y2		1.00	0.70	0.32
Y3			1.00	0.26
Y4				1.00

Inspection indicates that high school grade point averages showed the strongest relationship with college mathematics final grades with a correlation coefficient of r = 0.40 (Y1,Y4). This moderate to weak correlation indicates that none of the traditional predictors of success in college mathematics courses relate strongly to success in the college mathematics courses which these students have completed.

For the RDS students only, the highest correlation coefficient existing between the predictor variables and the college mathematics grade was r = 0.49 with the RDS Post-Test in algebra (Y1,Y6). Slightly smaller than that was the correlation coefficient of r = 0.41 between the RDS084 course grade and the regular college mathematics final grade (Y1,Y5). This indicates that success in the college mathematics courses for students in the RDS program is more accurately predicted by success in the RDS program than by the conventional predictors such as ACT scores and high school grades. However, the correlation of only 0.49 is at best moderately correlated rather than a strong relationship. These results are represented in TABLE III.

TABLE III

PEARSON CORRELATIONS FOR COLLEGE MATHEMATICS FINAL GRADES, RDS 084 COURSE GRADES, RDS POST ALGEBRA GRADES, ACT COMPOSITE SCORES, ACT MATHEMATICS SCORES, AND HIGH SCHOOL GRADE POINT AVERAGES
RDS GROUP ONLY - N = 213

	Y1	Y5	Y6	Y2	Y3	Y4
Y1	1.00	0.41	0.49	0.18	0.13*	0.40
Y5		1.00	0.33	0.08*	0.12*	0.28
Y6			1.00	0.25	0.29	0.34
Y2				1.00	0.46	0.22
Y3					1.00	0.07
Y4						1.00

In the case of non-RDS students, the highest correlation existed between the predictor variables ACT mathematics scores and high school grades and college mathematics grades as shown in TABLE IV. It is noted that these relationships, r = 0.41 (Y1,Y3) and r = 0.40 (Y1,Y4), are also moderate to weak rather than strong enough provide highly predictive information.

TABLE IV

PEARSON CORRELATIONS FOR COLLEGE MATHEMATICS FINAL GRADES, ACT COMPOSITE SCORES, ACT MATHEMATICS SCORES, AND HIGH SCHOOL GRADE POINT AVERAGES
NON-RDS GROUP ONLY - N = 143

	Y1	Y2	Y3	Y4
Y1	1.00	0.31	0.41	0.40
Y2		1.00	0.66	0.34
Y3			1.00	0.35
Y1				1.00

When the grade distributions for the RDS and non-RDS students were compared the results were that no statistically significant differences existed between the two distributions. These distributions reflected in TABLE V

indicate that grades ranged from "A - F" almost equally distributed for both groups with 60.1 percent of the RDS group and 63.0 percent of the non-RDS students achieving

TABLE V

GRADE DISTRIBUTIONS BY PERCENTAGE FOR
RDS AND NON-RDS STUDENTS COMPLETING COLLEGE
MATHEMATICS COURSES - N = 356

GROUP	GRADE IN COLLEGE MATHEMATICS % A	% B	% C	% D	% F	N OF CASES	CHI-SQUARED	SIGN. LEVEL
RDS	16.9	21.6	21.6	19.3	20.7	213	1.15	N.S.
NON-RDS	19.6	21.0	22.4	15.4	21.7	143		

a grade of "C" or better. Additional findings, not included in TABLE V, indicated that only six students had received a grade of "W" from the RDS group while 20 of the non-RDS students had withdrawn.

Further analysis indicated that the best predictors of how well an RDS student will perform in his/her regular college mathematics course is given by the multiple correlation, R = 0.59, using RDS post algebra scores, RDS 084 grades, and high school grade point averages (Y1,(Y6,Y5,Y4)). This value, produced from a stepwise linear regression model, produced $R^2 = 0.35$ or accounted for only thirty-five percent of the variance.

SUMMARY AND CONCLUSIONS

The analysis of variance procedure was employed to test whether statistically significant differences existed between the grades achieved in college mathematics courses by students who had completed RDS courses and those students who were not required to participate in the program. The results from the test indicated no statistically significant differences at the 0.05 level of measurement. Analysis of data revealed that approximately 60 percent of the students were achieving a grade of "C" or better in both RDS and non-RDS groups with slightly over twenty percent receiving a grade of "F". There seemed to be a greater tendency for students in the non-RDS group to withdraw from their college mathematics courses before completing it.

The Pearson correlational coefficient was used to determine the strength of the relationship existing between

the variables: (1) college mathematics grades, (2) high school grade point averages, RDS 084 course grades, RDS post algebra scores, ACT Composite scores, and ACT Mathematics scores. Results were that success in the RDS program was best for predicting achievement in college mathematics courses for students enrolled in the RDS program while conventional predictors such as ACT Mathematics scores and high school grades served as better predictors for non-RDS students. High school grades showed a stronger relationship than ACT scores for students in the RDS program. Results from the stepwise linear regression indicated that the best set of predictors of success in college mathematics by RDS students included the RDS post algebra scores, RDS 084 course grades, and high school grade point averages. However, there remains more unexplained variance than explained when considering any of these predictors of success in college mathematics courses.

It can be concluded that students who have completed the RDS program in mathematics do as well as students who enroll in these same courses but were not required to complete the RDS requirements. It appears that the majority of students who complete the RDS program in mathematics at Tennessee Technological University can expect to successfully complete the mathematics courses required of them in their major area of study.

REFERENCES

Baird, Leonard L. "Predicting Predictability: The Influence of Student and Institutional Characteristics on the # Prediction on Grades." Research in Higher Education, 21 (March 1984): 261-279.

Behrman, Jay A. and others. "Skills Intervention on Long Term Academic Performance." Journal of College Student Personnel , (July 1984): 326-331.

Brod, Rodney L.,and Mary Jean Brod. Native American Students in Basic Skills Mathematics at the University of Montana, Missoula, Montana, August 1982. (ERIC Document Reproduction Service No. ED 227 981).

Chang, Ping-Tang. College Developmental Mathematics: A National Survey, Augusta, Georgia, April 1983. (ERIC Document Reproduction Service No. ED 234 841).

Cross, K. Patricia. Beyond the Open Door. San Francisco: Jossey-Bass, 1976.

Edwards, Ronald R. "The Prediction of Success in Remedial # Mathematics Courses in the Public Community Junior College" Journal of Educational Research, 66 (December 1972): 57-60.

Ervin, Leroy, and Mark C. Hogrebe. "Comparison of the Prediction of Academic Performance for College Developmental Students and Regularly Admitted Students." Psychological Reports, 54 (February 1984): 319-327.

Guidelines for Program Development and for Mandatory Placement of Underprepared Students. The State Board of Regents. Tennessee, November 1984.

Head, Quinn L., and Jimmy D. Lindsey. "Remedial Math: Its Effect on the Final Grade in Algebra." Improving College and University Teaching, 32 (Summer 1984): 146-149.

Hill, Andrew. "Developmental Education: Does it Work; An ERIC Review." Community College Review, 6 (Fall 1978): 41-47.

Kolzow, Lee C. Study of Academic Progress by Students at Harper After Enrolling in Developmental Courses , February 1986. (ERIC Document Production Service No. ED 265 914).

Kulik, Chen-lin C. and others. "College Program for High-Risk and Disadvantaged Students. A Meta-Analysis of Findings." Review of Educational Research,53 (Fall 1983): 397-414.

McCornak, Robert L. and others. Remedial Education Programs at Two State Universities: A Comparison of Freshman Persistence and Performance . Annual Form Paper AIR 1985. (ERIC Document Production Service No. ED 259 684)

Morgan, William P. "Prediction of Success in Junior College Mathematics." The Mathematics Teacher, 63 (March 1970): 260-63.

Robyak, J. E. and R.G. Downey. "The Prediction of Long-Term Academic Performance After the Completion of a Study Skills Course." Measurement and Evaluation in Guidance , 12 (July 1979): 108-111.

Rodgers, Cheryl G. A Study of Pre to Post Attitudes And Correlates to Academic Achievement in Remedial and Developmental Studies at Tennessee Technological University . Paper presented at Tennessee Technological University, 1986.

Sparks, June R. and Cynthia L.Davis. Systems Analysis and Evaluation of a Junior College Developmental Studies Program . Paper presented to the Annual Meeting of the American Educational Research Association, New York, New York, April 1977. (ERIC Document Reproduction Service No. ED 136 892).

Statistical Analysis System , SAS Institute, Inc., Cary, North Carolina.

Wepner, Gabriello. Assessment of Mathematics Remediation at Rampo College of New Jersey . Paper presented at the Annual Meeting of the American Educational Research Association, Chicago, IL, April 1985. (ERIC Document Reproduction Service No. ED 255 377).

Whyte, Cassandra B. "Developmental Education and other Support Services in the 1980's." Journal of College Student Personnel , 26 (July 1985): 363-64.